

WHAT IS CLAIMED IS:

1. An optical device comprising a light transmissive plate-shaped light guide for guiding light incident from an end surface, an optical control layer provided on a lower surface of said plate-shaped light guide through a transparent electrode provided as a first electrode, and a reflection plate provided on a lower surface of said optical control layer through a transparent electrode provided as a second electrode,
wherein said optical control layer changes in refractive index by an electric field applied by said first electrode and said second electrode, shows a refractive index substantially same as or greater than that of said plate-shaped light guide when no electric field is applied and shows a small refractive index as compared with said plate-shaped light guide when an electric field is applied, and
said reflection plate is made of a light transmissive material, a reflection surface of said reflection plate is angled at a predetermined angle with respect to a surface thereof on said optical control layer side, and a reflection film is formed on said reflection surface.

2. The optical device as claimed in Claim 1, wherein said reflection surface comprises a sawtooth angled surface group having a predetermined inclination angle.

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3. An optical device comprising a light transmissive plate-shaped light guide for guiding light incident from an end surface, an optical control layer provided on a lower surface of said plate-shaped light guide
10 through a transparent electrode provided as a first electrode, and a reflection plate made of a light transmissive plate provided on a lower surface of said optical control layer through a second electrode comprising said transparent electrode,

15 wherein said optical control layer is made of a reverse mode polymer dispersed liquid crystal changing in scattering degree by an electric field applied by said first electrode and said second electrode, which is constructed by dispersing a low molecular-weight
20 liquid crystal in a liquid crystalline polymer, and said optical control layer becomes a uniform birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

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4. An optical device comprising a light transmissive plate-shaped light guide for guiding light incident from an end surface, an optical control layer provided on a lower surface of said plate-shaped light guide through a transparent electrode provided as a first electrode, and a second electrode which is an electrode provided on a lower surface of said optical control layer for making mirror reflection of light,

wherein said optical control layer is made of a reverse mode polymer dispersed liquid crystal changing in scattering degree by an electric field applied by said first electrode and said second electrode, which is constructed by dispersing a low molecular-weight liquid crystal in a liquid crystalline polymer, and said optical control layer becomes a uniform birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

20 5. An optical device comprising a light transmissive plate-shaped light guide for guiding light incident from an end surface, an optical control layer provided on a lower surface of said plate-shaped light guide through a transparent electrode provided as a first electrode, and a reflection plate made of a light transmissive plate provided on a lower surface of said

optical control layer through a transparent electrode provided as a second electrode,

wherein said optical control layer changes in diffraction ability by an electric field applied by 5 said first electrode and said second electrode.

6. An optical device comprising a light transmissive plate-shaped light guide for guiding light incident from an end surface, an optical control layer provided 10 on a lower surface of said plate-shaped light guide through a transparent electrode provided as a first electrode, and a second electrode which is an electrode provided on a lower surface of said optical control layer for making mirror reflection of light,

15 wherein said optical control layer changes in diffraction ability by an electric field applied by said first electrode and said second electrode.

7. The optical device as claimed in Claim 5, wherein 20 said optical control layer comprises one of constructions of liquid crystal particles dispersed in a polymer resin area, a polymer dispersed liquid crystal comprising polymer resin particles dispersed in a liquid crystal, and a polymer dispersed liquid 25 crystal in which respective polymer resin area and liquid crystal area form continuous areas, wherein

said liquid crystal has a structure periodically distributed in the form of a diffraction grating.

8. The optical device as claimed in Claim 6, wherein
5 said optical control layer comprises one of constructions of liquid crystal particles dispersed in a polymer resin area, a polymer dispersed liquid crystal comprising polymer resin particles dispersed in a liquid crystal, and a polymer dispersed liquid
10 crystal in which respective polymer resin area and liquid crystal area form continuous areas, wherein
said liquid crystal has a structure periodically distributed in the form of a diffraction grating.

15 9. The optical device as claimed in Claim 5, wherein
said optical control layer comprises a holographic polymer dispersed liquid crystal.

20 10. The optical device as claimed in Claim 6, wherein
said optical control layer comprises a holographic polymer dispersed liquid crystal.

25 11. The optical device as claimed in Claim 5, wherein
said optical control layer is made of a reverse mode polymer dispersed liquid crystal which is constructed by dispersing a low molecular-weight liquid crystal

in a liquid crystalline polymer, and said optical control layer becomes a uniform birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

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12. The optical device as claimed in Claim 6, wherein said optical control layer is made of a reverse mode polymer dispersed liquid crystal which is constructed by dispersing a low molecular-weight liquid crystal
10 in a liquid crystalline polymer, and said optical control layer becomes a uniform birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

15 13. An optical device comprising a light transmissive plate-shaped light guide for guiding light incident from an end surface, an optical control layer provided on a lower surface of said plate-shaped light guide through a transparent electrode provided as a first
20 electrode, a second electrode provided on a lower surface of said optical control layer, and a substrate provided on a lower surface of said second electrode, wherein at least one of said first electrode and said second electrode has

a periodic structure for inducing a fine periodic structure for light diffraction in said optical control layer, and

said optical control layer changes in refractive
5 index or absorptivity or scattering degree by an electric field applied by said first electrode and said second electrode.

14. The optical device as claimed in Claim 1, wherein
10 at least one of said first electrode and second electrode comprises an electrode group divided into strips, when both of said first electrode and second electrode comprise electrode groups divided into strips, said plurality of strip-formed electrodes
15 constituting said first electrode and said plurality of strip-formed electrodes constituting said second electrodes are disposed to be perpendicular to each other.

20 15. The optical device as claimed in Claim 2, wherein
at least one of said first electrode and second electrode comprises an electrode group divided into strips, when both of said first electrode and second electrode comprise electrode groups divided into
25 strips, said plurality of strip-formed electrodes constituting said first electrode and said plurality

of strip-formed electrodes constituting said second electrodes are disposed to be perpendicular to each other.

5 16. The optical device as claimed in Claim 3, wherein at least one of said first electrode and second electrode comprises an electrode group divided into strips, when both of said first electrode and second electrode comprise electrode groups divided into
10 strips, said plurality of strip-formed electrodes constituting said first electrode and said plurality of strip-formed electrodes constituting said second electrodes are disposed to be perpendicular to each other.

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17. The optical device as claimed in Claim 4, wherein at least one of said first electrode and second electrode comprises an electrode group divided into strips, when both of said first electrode and second electrode comprise electrode groups divided into
20 strips, said plurality of strip-formed electrodes constituting said first electrode and said plurality of strip-formed electrodes constituting said second electrodes are disposed to be perpendicular to each other.
25 other.

18. The optical device as claimed in Claim 5, wherein
at least one of said first electrode and second
electrode comprises an electrode group divided into
strips, when both of said first electrode and second
5 electrode comprise electrode groups divided into
strips, said plurality of strip-formed electrodes
constituting said first electrode and said plurality
of strip-formed electrodes constituting said second
electrodes are disposed to be perpendicular to each
10 other.

19. The optical device as claimed in Claim 6, wherein
at least one of said first electrode and second
electrode comprises an electrode group divided into
strips, when both of said first electrode and second
15 electrode comprise electrode groups divided into
strips, said plurality of strip-formed electrodes
constituting said first electrode and said plurality
of strip-formed electrodes constituting said second
electrodes are disposed to be perpendicular to each
20 other.

20. The optical device as claimed in Claim 10, wherein
at least one of said first electrode and second
25 electrode comprises an electrode group divided into
strips, when both of said first electrode and second

electrode comprise electrode groups divided into strips, said plurality of strip-formed electrodes constituting said first electrode and said plurality of strip-formed electrodes constituting said second electrode are disposed to be perpendicular to each other.

21. The optical device as claimed in Claim 1, wherein one of said first electrode and second electrode is divided into display pixel units and each of said divided display pixel units has a switching device.

22. The optical device as claimed in Claim 2, wherein one of said first electrode and second electrode is divided into display pixel units and each of said divided display pixel units has a switching device.

23. The optical device as claimed in Claim 3, wherein one of said first electrode and second electrode is divided into display pixel units and each of said divided display pixel units has a switching device.

24. The optical device as claimed in Claim 4, wherein one of said first electrode and second electrode is divided into display pixel units and each of said divided display pixel units has a switching device.

25. The optical device as claimed in Claim 5, wherein
one of said first electrode and second electrode is
divided into display pixel units and each of said
5 divided display pixel units has a switching device.
26. The optical device as claimed in Claim 6, wherein
one of said first electrode and second electrode is
divided into display pixel units and each of said
10 divided display pixel units has a switching device.
27. The optical device as claimed in Claim 10, wherein
one of said first electrode and second electrode is
divided into display pixel units and each of said
15 divided display pixel units has a switching device.
28. An optical device comprising a light transmissive
plate-shaped light guide for guiding light incident
from an end surface, an optical control layer provided
20 on a lower surface of said plate-shaped light guide,
periodic electrodes having periodic structures
disposed in alternation and provided on a lower surface
of said optical control layer for inducing a fine
periodic structure for light diffraction in said
25 optical control layer, and a substrate provided on a

lower surface of said periodic electrodes disposed in alternation,

wherein said optical control layer changes in refractive index or absorptivity or scattering degree
5 by an electric field applied by said periodic electrodes disposed in alternation.

29. The optical device as claimed in Claim 28, wherein
said electrode having periodic electrodes disposed in
10 alternation is provided for each of display pixel
units, and each of said divided display pixel units
has a switching device.

30. An optical device comprising: a light
15 transmissive plate-shaped light guide for guiding
light incident from an end surface; an optical control
layer provided on a lower surface of said plate-shaped
light guide through a transparent electrode provided
as a first electrode; a second electrode having a
20 plurality of divided electrodes, and a plurality of
third electrodes one to one corresponding to each of
said plurality of divided second electrodes and
penetrating through said substrate,

wherein said optical control layer changes in
25 refractive index or absorptivity or scattering degree

by an electric field applied by said first electrode and said second electrode,

each of said plurality of third electrodes has a first end part connecting to said second electrode and
5 a second end part exposed to a surface opposite to said second electrode side surface of said substrate, and

10 said respective electrodes are capable of being applied with a voltage from said substrate side discretely or dividedly in an optional number of groups.

31. An optical device comprising: a light transmissive plate-shaped light guide for guiding light incident from an end surface; a first stacked body integrated with an optical control layer provided on a lower surface of said plate-shaped light guide through a transparent electrode provided as a first electrode; and a second stacked body integrated with each of substrate divided into a plurality of units,
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20 wherein said second stacked body corresponds one to one to each of said second electrode divided into a plurality of units and a substrate provided on a lower surface of said electrode, has a plurality of third electrodes penetrating through said substrate, and
25 arranged on a lower surface of said optical control layer,

said optical control layer changes in refractive index or absorptivity or scattering degree by an electric field applied by said first electrode and second electrode,

- 5 each of said plurality of third electrodes has a first end part connecting to said second electrode and a second end part exposed to a surface opposite to said second electrode side of said substrate, and said respective electrodes are capable of being applied
- 10 with a voltage from said substrate side discretely or dividedly in an optional number of groups.

32. A display apparatus comprising an optical device and a illumination means for applying light to said optical device, wherein

 said optical device has an end surface for incident light from said illumination means, a light transmissive plate-shaped light guide for guiding incident light, an optical control layer provided on a lower surface of said plate-shaped light guide and changing in refractive index by an electric field applied through a transparent electrode provided as a first electrode, and a reflection plate provided on a lower surface of said optical control layer through a transparent electrode provided as a second electrode,

wherein said optical control layer has a liquid crystal exhibiting a refractive index substantially same as or greater than that of said plate-shaped light guide when no electric field is applied and a small
5 refractive index as compared with said plate-shaped light guide when an electric field is applied, and

said reflection plate is made of a light transmissive material, a reflection surface of said reflection plate opposite to said optical control
10 layer side is angled at a predetermined angle with respect to a side surface of said optical control layer, and a reflection film is provided on said reflection surface.

15 33. The display apparatus as claimed in Claim 32, wherein said reflection surface comprises a sawtooth angled surface group having a predetermined inclination angle.

20 34. A display apparatus comprising an optical device and a illumination means for applying light to said optical device, wherein

25 said optical device has an end surface for incident light from said illumination means, a light transmissive plate-shaped light guide for guiding incident light, an optical control layer provided on

a lower surface of said plate-shaped light guide, and
a reflection plate made of a light transmissive plate
provided on a lower surface of said optical control
layer through a transparent electrode provided as a
5 second electrode,

wherein said optical control layer is made of a
reverse mode polymer dispersed liquid crystal changing
in scattering degree by an electric field applied by
said first electrode and said second electrode, which
10 is constructed by dispersing a low molecular-weight
liquid crystal in a liquid crystalline polymer, and
said optical control layer becomes a uniform
birefringent thin film when no electric field is
applied and becomes a scattering state when an electric
15 field is applied.

35. A display apparatus comprising an optical device
and a illumination means for applying light to said
optical device, wherein
20 said optical device has an end surface for incident
light from said illumination means, a light
transmissive plate-shaped light guide for guiding
incident light, an optical control layer provided on
a lower surface of said plate-shaped light guide
25 through a transparent electrode provided as a first
electrode, and a second electrode provided as an

electrode on a lower surface of said optical control layer for making mirror reflection of light,

wherein said optical control layer is made of a reverse mode polymer dispersed liquid crystal changing 5 in scattering degree by an electric field applied by said first electrode and said second electrode, which is constructed by dispersing a low molecular-weight liquid crystal in a liquid crystalline polymer, and said optical control layer becomes a uniform 10 birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

36. A display apparatus comprising an optical device 15 and a illumination means for applying light to said optical device, wherein

said optical device has an end surface for incident light from said illumination means, a light transmissive plate-shaped light guide for guiding 20 incident light, an optical control layer provided on a lower surface of said plate-shaped light guide, and a reflection plate made of a light transmissive plate provided on a lower surface of said optical control layer through a transparent electrode provided as a 25 second electrode,

wherein said optical control layer changes in diffraction ability by an electric field applied by said first electrode and said second electrode.

5 37. A display apparatus comprising an optical device and a illumination means for applying light to said optical device,

said optical device has an end surface for incident light from said illumination means, a light
10 transmissive plate-shaped light guide for guiding incident light, an optical control layer provided on a lower surface of said plate-shaped light guide through a transparent electrode provided as a first electrode, and a second electrode provided as an
15 electrode on a lower surface of said optical control layer for making mirror reflection of light,

wherein said optical control layer changes in diffraction ability by an electric field applied by said first electrode and said second electrode.

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38. The display apparatus as claimed in Claim 36, wherein said optical control layer comprises one of constructions of liquid crystal particles dispersed in a polymer resin area, a polymer dispersed liquid
25 crystal comprising polymer resin particles dispersed in a liquid crystal, and a polymer dispersed liquid

crystal in which respective polymer resin area and liquid crystal area form continuous areas, wherein said liquid crystal has a structure periodically distributed in the form of a diffraction grating.

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39. The display apparatus as claimed in Claim 37, wherein said optical control layer comprises one of constructions of liquid crystal particles dispersed in a polymer resin area, a polymer dispersed liquid crystal comprising polymer resin particles dispersed in a liquid crystal, and a polymer dispersed liquid crystal in which respective polymer resin area and liquid crystal area form continuous areas, wherein said liquid crystal has a structure periodically distributed in the form of a diffraction grating.

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mode polymer dispersed liquid crystal which is constructed by dispersing a low molecular-weight liquid crystal in a liquid crystalline polymer, and said optical control layer becomes a uniform
5 birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

43. The display apparatus as claimed in Claim 37,
10 wherein said optical control layer is made of a reverse mode polymer dispersed liquid crystal which is constructed by dispersing a low molecular-weight liquid crystal in a liquid crystalline polymer, and said optical control layer becomes a uniform
15 birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

44. A display apparatus comprising an optical device
20 and a illumination means for applying light to said optical device;

said optical device having an end surface for incident light from said illumination means, a light transmissive plate-shaped light guide for guiding
25 incident light, an optical control layer provided on a lower surface of said plate-shaped light guide

through a transparent electrode provided as a first electrode, a periodic electrode provided as a second electrode having a periodic structure provided on a lower surface of said optical control layer for
5 inducing a fine periodic structure for light diffraction in said optical control layer, and a substrate provided on a lower surface of said second electrode,

wherein at least one of said first electrode and
10 said second electrode has
a periodic structure for inducing a fine periodic structure for light diffraction in said optical control layer, and

said optical control layer changes in refractive index or absorptivity or scattering degree by an applied electric field, and is made of a reverse mode polymer dispersed liquid crystal changing in refractive index or absorptivity or scattering degree by an electric field applied by said first electrode
15 and said second electrode, which is constructed by dispersing a low molecular-weight liquid crystal in a liquid crystalline polymer, and said optical control layer becomes a uniform birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

45. The display apparatus as claimed in Claim 32,
wherein at least one of said first electrode and second
electrode comprises an electrode group divided into
strips, when both of said first electrode and second
electrode comprise electrode groups divided into
strips, said plurality of strip-formed electrodes
constituting said first electrode and said plurality
of strip-formed electrodes constituting said second
electrodes are disposed to be perpendicular to each
other.

46. The display apparatus as claimed in Claim 33,
wherein at least one of said first electrode and second
electrode comprises an electrode group divided into
strips, when both of said first electrode and second
electrode comprise electrode groups divided into
strips, said plurality of strip-formed electrodes
constituting said first electrode and said plurality
of strip-formed electrodes constituting said second
electrodes are disposed to be perpendicular to each
other.

47. The display apparatus as claimed in Claim 34,
wherein at least one of said first electrode and second
electrode comprises an electrode group divided into
strips, when both of said first electrode and second

electrode comprise electrode groups divided into strips, said plurality of strip-formed electrodes constituting said first electrode and said plurality of strip-formed electrodes constituting said second 5 electrodes are disposed to be perpendicular to each other.

48. The display apparatus as claimed in Claim 35, wherein at least one of said first electrode and second 10 electrode comprises an electrode group divided into strips, when both of said first electrode and second electrode comprise electrode groups divided into strips, said plurality of strip-formed electrodes constituting said first electrode and said plurality 15 of strip-formed electrodes constituting said second electrodes are disposed to be perpendicular to each other.

49. The display apparatus as claimed in Claim 36, 20 wherein at least one of said first electrode and second electrode comprises an electrode group divided into strips, when both of said first electrode and second electrode comprise electrode groups divided into strips, said plurality of strip-formed electrodes 25 constituting said first electrode and said plurality of strip-formed electrodes constituting said second

electrodes are disposed to be perpendicular to each other.

50. The display apparatus as claimed in Claim 37,
5 wherein at least one of said first electrode and second electrode comprises an electrode group divided into strips, when both of said first electrode and second electrode comprise electrode groups divided into strips, said plurality of strip-formed electrodes
10 constituting said first electrode and said plurality of strip-formed electrodes constituting said second electrodes are disposed to be perpendicular to each other.
- 15 51. The display apparatus as claimed in Claim 44,
wherein at least one of said first electrode and second electrode comprises an electrode group divided into strips, when both of said first electrode and second electrode comprise electrode groups divided into
20 strips, said plurality of strip-formed electrodes constituting said first electrode and said plurality of strip-formed electrodes constituting said second electrodes are disposed to be perpendicular to each other.

52. The display apparatus as claimed in Claim 32,
wherein at least one of said first electrode and second
electrode is divided into display pixel units, and each
of said divided display pixel units has a switching
device.
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53. The display apparatus as claimed in Claim 33,
wherein at least one of said first electrode and second
electrode is divided into display pixel units, and each
10 of said divided display pixel units has a switching
device.
- 10
54. The display apparatus as claimed in Claim 34,
wherein at least one of said first electrode and second
15 electrode is divided into display pixel units, and each
of said divided display pixel units has a switching
device.
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55. The display apparatus as claimed in Claim 35,
20 wherein at least one of said first electrode and second
electrode is divided into display pixel units, and each
of said divided display pixel units has a switching
device.
- 20
56. The display apparatus as claimed in Claim 36,
wherein at least one of said first electrode and second
- 25

electrode is divided into display pixel units, and each of said divided display pixel units has a switching device.

5 57. The display apparatus as claimed in Claim 37, wherein at least one of said first electrode and second electrode is divided into display pixel units, and each of said divided display pixel units has a switching device.

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58. The display apparatus as claimed in Claim 44, wherein at least one of said first electrode and second electrode is divided into display pixel units, and each of said divided display pixel units has a switching device.

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59. A display apparatus comprising an optical device and a illumination means for applying light to said optical device;

20 said optical device having an end surface for incident light from said illumination means, a light transmissive plate-shaped light guide for guiding incident light, an optical control layer provided on a lower surface of said plate-shaped light guide, an
25 electrode having periodic electrodes with a periodic structure provided on a lower surface of said optical

control layer for inducing a fine periodic structure for light diffraction in said optical control layer, and a substrate provided on a lower surface of said electrode having periodic electrodes disposed in
5 alternation.

wherein said optical control layer changes in refractive index or absorptivity or scattering degree by an electric field applied by said periodic electrodes disposed in alternation.

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60. The display apparatus as claimed in Claim 59, wherein said electrode having periodic electrodes disposed in alternation is provided for each of display pixel units, and each of said display pixel units has
15 a switching device.

61. A display apparatus comprising an optical device and a illumination means for applying light to said optical device;

20 said optical device having an end surface for incident light from said illumination means, a light transmissive plate-shaped light guide for guiding incident light, an optical control layer provided on a lower surface of said plate-shaped light guide
25 through a transparent electrode provided as a first electrode, a second electrode provided on a lower

surface of said optical control layer and comprising
an electrode divided into a plurality of units, and
a plurality of third electrodes corresponding one to
one to each of said plurality of divided second
5 electrodes and penetrating through said substrate,
wherein said optical control layer changes in
refractive index or absorptivity or scattering degree
or diffraction ability by an electric field applied
by said first electrode and said second electrode,
10 each of said plurality of third electrodes has a
first end part connecting to said second electrode and
a second end part exposed to a surface opposite to said
second electrode side of said substrate, and said
respective electrodes are capable of being applied
15 with a voltage from said substrate side discretely or
dividedly in an optional number of groups.

62. A display apparatus comprising an optical device
and a illumination means for applying light to said
20 optical device;

said optical device having an end surface for
incident light from said illumination means, a light
transmissive plate-shaped light guide for guiding
incident light, a first stacked body integrated with
25 an optical control layer provided on a lower surface
of said plate-shaped light guide through a transparent

electrode provided as a first electrode, and a second stacked body integrated with each of substrate divided into a plurality of units,

wherein said second stacked body corresponds one
5 to one to each of said second electrode divided into a plurality of units and a substrate provided on a lower surface of said second electrode and said plurality of divided second electrodes, has a plurality of third electrodes penetrating through said substrate, and
10 arranged on a lower surface of said optical control layer,

said optical control layer changes in refractive index or absorptivity or scattering degree or diffraction ability by an electric field applied by
15 said first electrode and said second electrode,

each of said plurality of third electrodes has a first end part connecting to said second electrode and a second end part exposed to a surface opposite to said second electrode side of said substrate, and said
20 respective electrodes are capable of being applied with a voltage from said substrate side discretely or dividedly in an optional number of groups.

63. The display apparatus as claimed in Claim 32,
25 wherein said illumination means has at least a red light source, a blue light source, and a green light

source, and further comprising means for successively switching said red light source, blue light source and green light source in synchronization with display image.

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64. The display apparatus as claimed in Claim 33, wherein said illumination means has at least a red light source, a blue light source, and a green light source, and further comprising means for successively 10 switching said red light source, blue light source and green light source in synchronization with display image.

65. The display apparatus as claimed in Claim 34, 15 wherein said illumination means has at least a red light source, a blue light source, and a green light source, and further comprising means for successively switching said red light source, blue light source and green light source in synchronization with display 20 image.

66. The display apparatus as claimed in Claim 35, wherein said illumination means has at least a red light source, a blue light source, and a green light source, and further comprising means for successively 25 switching said red light source, blue light source and

green light source in synchronization with display image.

67. The display apparatus as claimed in Claim 36,
5 wherein said illumination means has at least a red
light source, a blue light source, and a green light
source, and further comprising means for successively
switching said red light source, blue light source and
green light source in synchronization with display
10 image.

68. The display apparatus as claimed in Claim 37,
wherein said illumination means has at least a red
light source, a blue light source, and a green light
15 source, and further comprising means for successively
switching said red light source, blue light source and
green light source in synchronization with display
image.

20 69. The display apparatus as claimed in Claim 44,
wherein said illumination means has at least a red
light source, a blue light source, and a green light
source, and further comprising means for successively
switching said red light source, blue light source and
25 green light source in synchronization with display
image.

70. The display apparatus as claimed in Claim 59,
wherein said illumination means has at least a red
light source, a blue light source, and a green light
5 source, and further comprising means for successively
switching said red light source, blue light source and
green light source in synchronization with display
image.
- 10 71. The display apparatus as claimed in Claim 60,
wherein said illumination means has at least a red
light source, a blue light source, and a green light
source, and further comprising means for successively
switching said red light source, blue light source and
15 green light source in synchronization with display
image.
72. The display apparatus as claimed in Claim 61,
wherein said illumination means has at least a red
20 light source, a blue light source, and a green light
source, and further comprising means for successively
switching said red light source, blue light source and
green light source in synchronization with display
image.

73. The display apparatus as claimed in Claim 62,
wherein said illumination means has at least a red
light source, a blue light source, and a green light
source, and further comprising means for successively
5 switching said red light source, blue light source and
green light source in synchronization with display
image.

74. An optical device comprising a light transmissive
10 plate-shaped light guide for guiding light incident
from an end surface, an optical control layer provided
on a lower surface of said plate-shaped light guide
through a transparent electrode provided as a first
electrode, a reflection film provided on a lower
15 surface of said optical control layer, a second
electrode provided on a lower surface of said
reflection film, and a substrate provided on a lower
surface of said second electrode,

wherein said optical control layer changes in
20 scattering degree or diffraction efficiency by an
electric field applied by said first electrode and said
second electrode,

75. The optical device as claimed in Claim 74, further
25 comprising a light absorption film disposed between
said reflection film and said second electrode.

76. An optical device comprising a light transmissive plate-shaped light guide for guiding light incident from an end surface, an optical control layer provided
5 on a lower surface of said light guide through a transparent electrode provided as a first electrode, and a transparent electrode provided as a second electrode provided on a lower surface of said optical control layer,
- 10 wherein said optical control layer changes in scattering degree or diffraction efficiency by an electric field applied by said first electrode and said second electrode.
- 15 77. The optical device as claimed in Claim 76, further comprising a light absorption film provided on a lower surface of said reflection film.
78. An optical device comprising a light transmissive plate-shaped light guide for guiding light incident from an end surface, an optical control layer provided
20 on a lower surface of said plate-shaped light guide through a transparent electrode provided as a first electrode, a reflection film provided on a lower surface of said optical control layer, a second electrode provided on a lower surface of said

reflection film, and a substrate provided on a lower surface of said second electrode,

wherein at least one of said first electrode and said second electrode has

- 5 a periodic structure for inducing a fine periodic structure for light diffraction in said optical control layer, and

said optical control layer changes in refractive index or scattering degree or absorbance by an electric
10 field applied by said first electrode and said second electrode.

79. The optical device as claimed in Claim 78, further comprising a light absorption film disposed between
15 said reflection film and said second electrode.

80. The optical device as claimed in Claim 74 or 75,
wherein at least one of said first electrode and said
second electrode comprises an electrode group divided
20 into strips, when both of said first electrode and said
second electrode comprise electrode groups divided
into strips, said plurality of strip-formed electrodes
constituting said first electrode and said plurality
of strip-formed electrodes constituting said second
25 electrodes are disposed to be perpendicular to each
other.

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81. The optical device as claimed in Claim 76 or 77,
wherein at least one of said first electrode and said
second electrode comprises an electrode group divided
5 into strips, when both of said first electrode and said
second electrode comprise electrode groups divided
into strips, said plurality of strip-formed electrodes
constituting said first electrode and said plurality
of strip-formed electrodes constituting said second
10 electrodes are disposed to be perpendicular to each
other.

82. The optical device as claimed in Claim 78 or 79,
wherein at least one of said first electrode and said
15 second electrode comprises an electrode group divided
into strips, when both of said first electrode and said
second electrode comprise electrode groups divided
into strips, said plurality of strip-formed electrodes
constituting said first electrode and said plurality
20 of strip-formed electrodes constituting said second
electrodes are disposed to be perpendicular to each
other.

83. The optical device as claimed in Claim 74 or 75,
25 wherein at least one of said first electrode and said
second electrode is divided into display pixel units,

and each of said divided display pixel units has a switching device.

84. The optical device as claimed in Claim 76 or 77,
5 wherein at least one of said first electrode and said second electrode is divided into display pixel units, and each of said divided display pixel units has a switching device.
- 10 85. The optical device as claimed in Claim 78 or 79, wherein at least one of said first electrode and said second electrode is divided into display pixel units, and each of said divided display pixel units has a switching device.

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86. An optical device comprising a light transmissive plate-shaped light guide for guiding light incident from an end surface, an optical control layer provided on a lower surface of said plate-shaped light guide,
20 a reflection film provided on a lower surface of said optical control layer, an electrode comprising periodic electrodes having periodic structures disposed in alternation and provided on a lower surface of said reflection film for inducing a fine periodic structure for light diffraction in said optical control layer, and a substrate provided on a lower

surface of said electrode having periodic electrodes disposed in alternation.

wherein said optical control layer changes in refractive index or scattering degree or absorbance 5 by an electric field applied by said electrode having periodic electrodes disposed in alternation.

87. The optical device as claimed in Claim 86, further comprising a light absorption film disposed between 10 said reflection film and said electrode having periodic electrodes disposed in alternation.

88. The optical device as claimed in Claim 86 or 87, wherein said electrode having periodic electrodes 15 disposed in alternation is provided for each of display pixel units, and each of said divided display pixel units has a switching device.

89. An optical device comprising: a light transmissive plate-shaped light guide for guiding 20 light incident from an end surface; an optical control layer provided on a lower surface of said plate-shaped light guide through a transparent electrode provided as a first electrode; a reflection film provided on 25 a lower surface of said optical control layer, a second electrode divided into a plurality of electrodes

provided on a lower surface of said reflection film,
a substrate provided on a lower surface of said second
electrode, and a plurality of third electrodes one to
one corresponding to each of said plurality of divided
5 second electrodes and penetrating through said
substrate,

wherein said optical control layer changes in
refractive index or absorptivity or scattering degree
or diffraction ability by an electric field applied
10 by said first electrode and said second electrode,

each of said plurality of third electrodes has a
first end part connecting to said second electrode and
a second end part exposed to a surface opposite to said
second electrode side surface of said substrate, and
15 said respective electrodes are capable of being
applied with a voltage from said substrate side
discretely or dividedly in an optional number of
groups.

20 90. The optical device as claimed in Claim 89, further
comprising a light absorption film disposed between
said reflection film and said second electrode.

91. An optical device comprising: a light
25 transmissive plate-shaped light guide for guiding
light incident from an end surface; a first stacked

body integrated with an optical control layer provided on a lower surface of said plate-shaped light guide through a transparent electrode provided as a first electrode, and a second stacked body integrated with each of substrate divided into a plurality of units,

wherein said second stacked body has a reflection film, a second electrode divided into a plurality of units, a substrate provided on a lower surface of said second electrode, and a plurality of third electrodes corresponding one to one to each of said plurality of second electrode, penetrating through said substrate, and arranged on a lower surface of said optical control layer,

said optical control layer changes in refractive index or absorptivity or scattering degree or diffraction ability by an electric field applied by said first electrode and said second electrode,

each of said plurality of third electrodes has a first end part connecting to said second electrode and a second end part exposed to a surface opposite to said second electrode side of said substrate, and said respective electrodes are capable of being applied with a voltage from said substrate side discretely or dividedly in an optional number of groups.

92. The optical device as claimed in Claim 91, further comprising a light absorption film disposed between said reflection film and said second electrode.
- 5 93. The optical device as claimed in Claim 74 or 75, wherein said optical control layer is made of a reverse mode polymer dispersed liquid crystal which is constructed by dispersing a low molecular-weight liquid crystal in a liquid crystalline polymer, and
10 said optical control layer becomes a uniform birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.
- 15 94. The optical device as claimed in Claim 76 or 77, wherein said optical control layer is made of a reverse mode polymer dispersed liquid crystal which is constructed by dispersing a low molecular-weight liquid crystal in a liquid crystalline polymer, and
20 said optical control layer becomes a uniform birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.
- 25 95. The optical device as claimed in Claim 78 or 79, wherein said optical control layer is made of a reverse

mode polymer dispersed liquid crystal which is constructed by dispersing a low molecular-weight liquid crystal in a liquid crystalline polymer, and said optical control layer becomes a uniform

5 birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

96. The optical device as claimed in Claim 86 or 87,
10 wherein said optical control layer is made of a reverse mode polymer dispersed liquid crystal which is constructed by dispersing a low molecular-weight liquid crystal in a liquid crystalline polymer, and said optical control layer becomes a uniform
15 birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

97. The optical device as claimed in Claim 89 or 90,
20 wherein said optical control layer is made of a reverse mode polymer dispersed liquid crystal which is constructed by dispersing a low molecular-weight liquid crystal in a liquid crystalline polymer, and said optical control layer becomes a uniform
25 birefringent thin film when no electric field is

applied and becomes a scattering state when an electric field is applied.

98. The optical device as claimed in Claim 91 or 92,
5 wherein said optical control layer is made of a reverse mode polymer dispersed liquid crystal which is constructed by dispersing a low molecular-weight liquid crystal in a liquid crystalline polymer, and said optical control layer becomes a uniform birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

99. The optical device as claimed in Claim 74 or 75,
15 wherein said optical control layer comprises one of constructions of liquid crystal particles dispersed in a polymer resin area, a polymer dispersed liquid crystal comprising polymer resin particles dispersed in a liquid crystal, and a polymer dispersed liquid 20 crystal in which respective polymer resin area and liquid crystal area form continuous areas.

100. The optical device as claimed in Claim 76 or 77,
wherein said optical control layer comprises one of
25 constructions of liquid crystal particles dispersed in a polymer resin area, a polymer dispersed liquid

crystal comprising polymer resin particles dispersed in a liquid crystal, and a polymer dispersed liquid crystal in which respective polymer resin area and liquid crystal area form continuous areas.

5

101. The optical device as claimed in Claim 78 or 79, wherein said optical control layer comprises one of constructions of liquid crystal particles dispersed in a polymer resin area, a polymer dispersed liquid crystal comprising polymer resin particles dispersed in a liquid crystal, and a polymer dispersed liquid crystal in which respective polymer resin area and liquid crystal area form continuous areas.

15 102. The optical device as claimed in Claim 86 or 87, wherein said optical control layer comprises one of constructions of liquid crystal particles dispersed in a polymer resin area, a polymer dispersed liquid crystal comprising polymer resin particles dispersed in a liquid crystal, and a polymer dispersed liquid crystal in which respective polymer resin area and liquid crystal area form continuous areas.

20 103. The optical device as claimed in Claim 89 or 90, wherein said optical control layer comprises one of constructions of liquid crystal particles dispersed

in a polymer resin area, a polymer dispersed liquid crystal comprising polymer resin particles dispersed in a liquid crystal, and a polymer dispersed liquid crystal in which respective polymer resin area and
5 liquid crystal area form continuous areas.

104. The optical device as claimed in Claim 91 or 92, wherein said optical control layer comprises one of constructions of liquid crystal particles dispersed in a polymer resin area, a polymer dispersed liquid crystal comprising polymer resin particles dispersed in a liquid crystal, and a polymer dispersed liquid crystal in which respective polymer resin area and
10 liquid crystal area form continuous areas.

15

105. The optical device as claimed in Claim 74 or 75, wherein said optical control layer comprises a holographic polymer dispersed liquid crystal of liquid crystal area having a structure periodically distributed in the form of a diffraction grating.
20

106. The optical device as claimed in Claim 76 or 77, wherein said optical control layer comprises a holographic polymer dispersed liquid crystal of liquid crystal area having a structure periodically distributed in the form of a diffraction grating.
25

107. The optical device as claimed in Claim 78 or 79,
wherein said optical control layer comprises a
holographic polymer dispersed liquid crystal of liquid
5 crystal area having a structure periodically
distributed in the form of a diffraction grating.
108. The optical device as claimed in Claim 86 or 87,
wherein said optical control layer comprises a
10 holographic polymer dispersed liquid crystal of liquid
crystal area having a structure periodically
distributed in the form of a diffraction grating.
109. The optical device as claimed in Claim 89 or 90,
15 wherein said optical control layer comprises a
holographic polymer dispersed liquid crystal of liquid
crystal area having a structure periodically
distributed in the form of a diffraction grating.
- 20 110. The optical device as claimed in Claim 91 or 92,
wherein said optical control layer comprises a
holographic polymer dispersed liquid crystal of liquid
crystal area having a structure periodically
distributed in the form of a diffraction grating.

111. The optical device as claimed in Claim 74 or 75,
wherein said reflection film comprises one selected
from:

- a dielectric multilayered film; and
5 a film lower in refractive index than said light
guide.

112. The optical device as claimed in Claim 76 or 77,
wherein said reflection film comprises one selected
10 from:

- a dielectric multilayered film; and
a film lower in refractive index than said light
guide.

15 113. The optical device as claimed in Claim 78 or 79,
wherein said reflection film comprises one selected
from:

- a dielectric multilayered film; and
a film lower in refractive index than said light
20 guide.

114. The optical device as claimed in Claim 86 or 87,
wherein said reflection film comprises one selected
from:

- 25 a dielectric multilayered film; and

a film lower in refractive index than said light guide.

115. The optical device as claimed in Claim 89 or 90,
5 wherein said reflection film comprises one selected from:

a dielectric multilayered film; and
a film lower in refractive index than said light guide.

10

116. The optical device as claimed in Claim 91 or 92,
wherein said reflection film comprises one selected
from:

a dielectric multilayered film; and
a film lower in refractive index than said light guide.

15

117. A display apparatus comprising an optical device
and a illumination means for applying light to said
20 optical device,

25

said optical device having an end surface for
incident light from said illumination means, a light
transmissive plate-shaped light guide for guiding
incident light, an optical control layer provided on
a lower surface of said light guide through a
transparent electrode provided as a first electrode,

a reflection film provided on a lower surface of said optical control layer, a second electrode provided on a lower surface of said reflection film, and a substrate provided on a lower surface of said second electrode,

5 wherein said optical control layer changes in scattering degree or diffraction efficiency by an electric field applied by said first electrode and said second electrode.

10

118. The display apparatus as claimed in Claim 117, further comprising a light absorption film disposed between said reflection film and said second electrode.

15

119. A display apparatus comprising an optical device and a illumination means for applying light to said optical device,

said optical device having an end surface for
20 incident light from said illumination means, a light transmissive plate-shaped light guide for guiding incident light, an optical control layer provided on a lower surface of said plate-shaped light guide through a transparent electrode provided as a first electrode, a reflection film provided on a lower surface of said optical control layer through a

transparent electrode provided as a second electrode, and a substrate provided on a lower surface of said reflection film,

wherein said optical control layer changes in
5 scattering degree or diffraction efficiency by an electric field applied by said first electrode and said second electrode.

120. The display apparatus as claimed in Claim 119,
10 further comprising a light absorption film provided on a lower surface of said reflection film.

121. A display apparatus comprising an optical device and a illumination means for applying light to said
15 optical device,

said optical device having an end surface for incident light from said illumination means, a light transmissive plate-shaped light guide for guiding incident light, an optical control layer provided on
20 a lower surface of said light guide through a transparent electrode provided as a first electrode, a reflection film provided on a lower surface of said optical control layer, a second electrode provided on a lower surface of said reflection film, and a
25 substrate provided on a lower surface of said second electrode,

wherein at least one of said first electrode and
said second electrode has
a periodic structure for inducing a fine periodic
structure for light diffraction in said optical
5 control layer, and

said optical control layer changes in refractive
index or scattering degree or absorbance by an electric
field applied by said first electrode and said second
electrode.

10

122. The display apparatus as claimed in Claim 121,
further comprising a light absorption film disposed
between said reflection film and said second
electrode.

15

123. The display apparatus as claimed in Claim 117 or
118, wherein at least one of said first electrode and
said second electrode comprises an electrode group
divided into strips, when both of said first electrode
20 and said second electrode comprise electrode groups
divided into strips, said plurality of strip-formed
electrodes constituting said first electrode and said
plurality of strip-formed electrodes constituting
said second electrodes are disposed to be
25 perpendicular to each other.

124. The display apparatus as claimed in Claim 119 or
120, wherein at least one of said first electrode and
said second electrode comprises an electrode group
divided into strips, when both of said first electrode
5 and said second electrode comprise electrode groups
divided into strips, said plurality of strip-formed
electrodes constituting said first electrode and said
plurality of strip-formed electrodes constituting
said second electrodes are disposed to be
10 perpendicular to each other.

125. The display apparatus as claimed in Claim 121 or
122, wherein at least one of said first electrode and
said second electrode comprises an electrode group
15 divided into strips, when both of said first electrode
and said second electrode comprise electrode groups
divided into strips, said plurality of strip-formed
electrodes constituting said first electrode and said
plurality of strip-formed electrodes constituting
20 said second electrodes are disposed to be
perpendicular to each other.

126. The display apparatus as claimed in Claim 117 or
118, wherein at least one of said first electrode and
25 said second electrode is divided into display pixel

units, and each of said divided display pixel units has a switching device.

127. The display apparatus as claimed in Claim 119 or
5 120, wherein at least one of said first electrode and said second electrode is divided into display pixel units, and each of said divided display pixel units has a switching device.

10 128. The display apparatus as claimed in Claim 121 or 122, wherein at least one of said first electrode and said second electrode is divided into display pixel units, and each of said divided display pixel units has a switching device.

15

129. A display apparatus comprising an optical device and a illumination means for applying light to said optical device,

said optical device having an end surface for
20 incident light from said illumination means, a light transmissive plate-shaped light guide for guiding incident light, an optical control layer provided on a lower surface of said plate-shaped light guide, a reflection film provided on a lower surface of said
25 optical control layer, an electrode comprising periodic electrodes disposed in alternation having a

periodic structure provided on a lower surface of said reflection film for inducing a fine periodic structure for light diffraction in said optical control layer, and a substrate provided on a lower surface of said electrodes disposed in alternation,

wherein said optical control layer changes in refractive index or scattering degree or absorbance by an electric field applied by said periodic electrodes disposed in alternation.

10

130. The display apparatus as claimed in Claim 129, further comprising a light absorption film disposed between said reflection film and said electrode having periodic electrodes disposed in alternation.

15

131. The display apparatus as claimed in Claim 129 or 130, wherein said electrode having periodic electrodes disposed in alternation is provided for each of display pixel units, and each of said display pixel units has a switching device.

20
132. A display apparatus comprising: an optical device, a illumination means for applying light to said optical device,

25
said optical device having an end surface for incident light from said illumination means, a light

transmissive plate-shaped light guide for guiding incident light, an optical control layer provided on a lower surface of said plate-shaped light guide through a transparent electrode provided as a first 5 electrode, a reflection film provided on a lower surface of said optical control layer, a second electrode comprising an electrode divided into a plurality of units provided on a lower surface of said reflection film, a substrate provided on a lower 10 surface of said second electrode, and a plurality of third electrodes corresponding one to one to each of said plurality of second electrode, penetrating through said substrate,

wherein said optical control layer changes in 15 refractive index or absorptivity or scattering degree or diffraction ability by an electric field applied by said first electrode and said second electrode,

each of said plurality of third electrodes has a first end part connecting to said second electrode and 20 a second end part exposed to a surface opposite to said second electrode side of said substrate, and said respective electrodes are capable of being applied with a voltage from said substrate side discretely or dividedly in an optional number of groups.

133. The display apparatus as claimed in Claim 132, further comprising a light absorption film disposed between said reflection film and said second electrode.

5

134. A display apparatus comprising: an optical device, a illumination means for applying light to said optical device,

said optical device having an end surface for incident light from said illumination means, a light transmissive plate-shaped light guide for guiding incident light, a first stacked body integrated with an optical control layer provided on a lower surface of said plate-shaped light guide through a transparent electrode provided as a first electrode, and a second stacked body integrated with each of substrate divided into a plurality of units,

wherein said second stacked body has a reflection film, a second electrode divided into a plurality of units provided on a lower surface of said reflection film, a substrate provided on a lower surface of said plurality of divided second electrodes, and a plurality of third electrodes corresponding one to one to each of said plurality of divided second electrodes, 25 penetrating through said substrate, and arranged on a lower surface of said optical control layer.

said optical control layer changes in refractive index or absorptivity or scattering degree or diffraction ability by an electric field applied by said first electrode and said second electrode,

5 each of said plurality of third electrodes has a first end part connecting to said second electrode and a second end part exposed to a surface opposite to said second electrode side of said substrate, and said respective electrodes are capable of being applied
10 with a voltage from said substrate side discretely or dividedly in an optional number of groups.

135. The display apparatus as claimed in Claim 134, further comprising a light absorption film provided
15 between said reflection film and said second electrode.

136. The display apparatus as claimed in Claim 117 or 118, wherein said optical control layer is made of a
20 reverse mode polymer dispersed liquid crystal which is constructed by dispersing a low molecular-weight liquid crystal in a liquid crystalline polymer, and said optical control layer becomes a uniform birefringent thin film when no electric field is
25 applied and becomes a scattering state when an electric field is applied.

137. The display apparatus as claimed in Claim 119 or
120, wherein said optical control layer is made of a
reverse mode polymer dispersed liquid crystal which
5 is constructed by dispersing a low molecular-weight
liquid crystal in a liquid crystalline polymer, and
said optical control layer becomes a uniform
birefringent thin film when no electric field is
applied and becomes a scattering state when an electric
10 field is applied.

138. The display apparatus as claimed in Claim 121 or
122, wherein said optical control layer is made of a
reverse mode polymer dispersed liquid crystal which
15 is constructed by dispersing a low molecular-weight
liquid crystal in a liquid crystalline polymer, and
said optical control layer becomes a uniform
birefringent thin film when no electric field is
applied and becomes a scattering state when an electric
20 field is applied.

139. The display apparatus as claimed in Claim 129 or
130, wherein said optical control layer is made of a
reverse mode polymer dispersed liquid crystal which
25 is constructed by dispersing a low molecular-weight
liquid crystal in a liquid crystalline polymer, and

said optical control layer becomes a uniform birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

5

140. The display apparatus as claimed in Claim 132 or 133, wherein said optical control layer is made of a reverse mode polymer dispersed liquid crystal which is constructed by dispersing a low molecular-weight 10 liquid crystal in a liquid crystalline polymer, and said optical control layer becomes a uniform birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

15

141. The display apparatus as claimed in Claim 134 or 135, wherein said optical control layer is made of a reverse mode polymer dispersed liquid crystal which is constructed by dispersing a low molecular-weight 20 liquid crystal in a liquid crystalline polymer, and said optical control layer becomes a uniform birefringent thin film when no electric field is applied and becomes a scattering state when an electric field is applied.

25

142. The display apparatus as claimed in Claim 117 or
118, wherein said optical control layer comprises one
of constructions of liquid crystal particles dispersed
in a polymer resin area, a polymer dispersed liquid
5 crystal comprising polymer resin particles dispersed
in a liquid crystal, and a polymer dispersed liquid
crystal in which respective polymer resin area and
liquid crystal area form continuous areas.
- 10 143. The display apparatus as claimed in Claim 119 or
120, wherein said optical control layer comprises one
of constructions of liquid crystal particles dispersed
in a polymer resin area, a polymer dispersed liquid
crystal comprising polymer resin particles dispersed
15 in a liquid crystal, and a polymer dispersed liquid
crystal in which respective polymer resin area and
liquid crystal area form continuous areas.
144. The display apparatus as claimed in Claim 121 or
20 122, wherein said optical control layer comprises one
of constructions of liquid crystal particles dispersed
in a polymer resin area, a polymer dispersed liquid
crystal comprising polymer resin particles dispersed
in a liquid crystal, and a polymer dispersed liquid
25 crystal in which respective polymer resin area and
liquid crystal area form continuous areas.

145. The display apparatus as claimed in Claim 129 or
130, wherein said optical control layer comprises one
of constructions of liquid crystal particles dispersed
5 in a polymer resin area, a polymer dispersed liquid
crystal comprising polymer resin particles dispersed
in a liquid crystal, and a polymer dispersed liquid
crystal in which respective polymer resin area and
liquid crystal area form continuous areas.

10

146. The display apparatus as claimed in Claim 132 or
133, wherein said optical control layer comprises one
of constructions of liquid crystal particles dispersed
in a polymer resin area, a polymer dispersed liquid
15 crystal comprising polymer resin particles dispersed
in a liquid crystal, and a polymer dispersed liquid
crystal in which respective polymer resin area and
liquid crystal area form continuous areas.

20 147. The display apparatus as claimed in Claim 134 or
135, wherein said optical control layer comprises one
of constructions of liquid crystal particles dispersed
in a polymer resin area, a polymer dispersed liquid
crystal comprising polymer resin particles dispersed
25 in a liquid crystal, and a polymer dispersed liquid

crystal in which respective polymer resin area and liquid crystal area form continuous areas.

148. The display apparatus as claimed in Claim 117 or
5 118, wherein said optical control layer comprises a
holographic polymer dispersed liquid crystal of liquid
crystal area having a structure periodically
distributed in the form of a diffraction grating.

10 149. The display apparatus as claimed in Claim 119 or
120, wherein said optical control layer comprises a
holographic polymer dispersed liquid crystal of liquid
crystal area having a structure periodically
distributed in the form of a diffraction grating.

15

150. The display apparatus as claimed in Claim 121 or
122, wherein said optical control layer comprises a
holographic polymer dispersed liquid crystal of liquid
crystal area having a structure periodically
20 distributed in the form of a diffraction grating.

151. The display apparatus as claimed in Claim 129 or
130, wherein said optical control layer comprises a
holographic polymer dispersed liquid crystal of liquid
25 crystal area having a structure periodically
distributed in the form of a diffraction grating.

152. The display apparatus as claimed in Claim 132 or
133, wherein said optical control layer comprises a
holographic polymer dispersed liquid crystal of liquid
5 crystal area having a structure periodically
distributed in the form of a diffraction grating.
153. The display apparatus as claimed in Claim 134 or
135, wherein said optical control layer comprises a
10 holographic polymer dispersed liquid crystal of liquid
crystal area having a structure periodically
distributed in the form of a diffraction grating.
154. The display apparatus as claimed in Claim 117 or
118, wherein said reflection film comprises a film
15 lower in refractive index than a dielectric
multilayered film or said light guide.
155. The display apparatus as claimed in Claim 119 or
120, wherein said reflection film comprises a film
20 lower in refractive index than a dielectric
multilayered film or said light guide.
156. The display apparatus as claimed in Claim 121 or
122, wherein said reflection film comprises a film

lower in refractive index than a dielectric multilayered film or said light guide.

157. The display apparatus as claimed in Claim 129 or
5 130, wherein said reflection film comprises a film lower in refractive index than a dielectric multilayered film or said light guide.

158. The display apparatus as claimed in Claim 132 or
10 133, wherein said reflection film comprises a film lower in refractive index than a dielectric multilayered film or said light guide.

159. The display apparatus as claimed in Claim 134 or
15 135, wherein said reflection film comprises a film lower in refractive index than a dielectric multilayered film or said light guide.

160. The display apparatus as claimed in Claim 117 or
20 118, wherein said illumination means has at least a red light source, a blue light source, and a green light source, and further comprising means for successively switching said red light source, blue light source and green light source in synchronization with display
25 image.

161. The display apparatus as claimed in Claim 119 or
10 120, wherein said illumination means has at least a
red light source, a blue light source, and a green light
source, and further comprising means for successively
5 switching said red light source, blue light source and
green light source in synchronization with display
image.
162. The display apparatus as claimed in Claim 121 or
10 122, wherein said illumination means has at least a
red light source, a blue light source, and a green light
source, and further comprising means for successively
switching said red light source, blue light source and
green light source in synchronization with display
15 image.
163. The display apparatus as claimed in Claim 129 or
10 130, wherein said illumination means has at least a
red light source, a blue light source, and a green light
source, and further comprising means for successively
20 switching said red light source, blue light source and
green light source in synchronization with display
image.
- 25 164. The display apparatus as claimed in Claim 132 or
133, wherein said illumination means has at least a

red light source, a blue light source, and a green light source, and further comprising means for successively switching said red light source, blue light source and green light source in synchronization with display
5 image.

165. The display apparatus as claimed in Claim 134 or 135, wherein said illumination means has at least a red light source, a blue light source, and a green light 10 source, and further comprising means for successively switching said red light source, blue light source and green light source in synchronization with display image.